

EXHIBIT 1

**UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

SOLAS OLED LTD.,

Plaintiff,

Case No. 2:19-cv-00152-JRG

v.

SAMSUNG DISPLAY CO., LTD., et al.,

Defendants.

DECLARATION OF RICHARD A. FLASCK

I, Richard A. Flasck, declare and state as follows:

I. INTRODUCTION

1. I have been retained as an expert in the above captioned case by Solas OLED Limited. I understand that Solas has asserted three patents in this case, but that the parties are only disputing the constructions of two of those patents: U.S. Patent Nos. 7,446,338 and 9,256,311.

2. I have been asked to consider and opine on claim constructions for disputed claims terms in these patents, which I set forth and address in separate sections below for each term.

3. In forming my opinions, I have reviewed, considered, and/or had access to the patent specifications and claims, their prosecution histories, the parties' proposed claim constructions, and the extrinsic evidence cited by the parties in connection with those proposed constructions. I have also relied on my professional and academic experience in the fields of flat panel displays and touch sensors. I reserve the right to consider additional materials as I become aware of them and to revise my opinions accordingly.

II. QUALIFICATIONS

4. My qualifications for forming the opinions set forth in this Declaration are summarized here and explained in more detail in my *curriculum vitae*, which is attached as Exhibit A.

5. I received a Bachelor of Science degree in Physics from the University of Michigan, Ann Arbor, in 1970. I thereafter received a Master of Science degree in Physics from Oakland University in Rochester, Michigan, in 1976. I am the founder and CEO of RAF Electronics Corp., where I developed and patented Liquid Crystal on Silicon (LCOS) microdisplay projection technology using active matrix transistor arrays as well as developed proprietary LED-based Solid State Lighting (SSL) products.

6. After receiving my Bachelor's degree, I was employed as a scientist and a manager by Energy Conversion Devices, Inc., from 1970 through 1982. My work at Energy Conversion Devices concerned the development of electroluminescent displays, thin film photovoltaics, ablative imaging films, non-volatile memory, multi-chip modules, and superconducting materials. After leaving Energy Conversion Devices, I founded and served as CEO of Alphasil, Inc., where I developed amorphous silicon thin film transistor (TFT) active matrix liquid crystal displays (AMLCDs). My work at Alphasil included thin film transistor array substrate process and circuit design, data driver and gate driver design, scalars, video circuits, gamma correction circuits, backlighting, and inverter design. At Alphasil I also designed and incorporated touch panel screens into active matrix display devices. The touch panel technologies included surface acoustic wave and capacitive sensing. I worked at Alphasil from 1982 through 1989.

7. After leaving Alphasil, I founded RAF Electronics Corp., described above. I have served as CEO of RAF Electronics since that time. At RAF I developed HDTV projection technology including transistor array substrates for LCOS devices and the associated optical systems. My activities at RAF have included developments in lighting systems using both traditional LED and OLED (Organic Light Emitting Diode) technologies. In 2016 I was granted US Patent 9,328,898 which includes OLED and LED technology and lighting systems. In 2019 RAF received a CalSEED grant from the California Energy Commission to develop ultra-efficient lighting products and explore establishing a Central Valley manufacturing facility.

8. In 1997, I took the position of President and COO at Alien Technology Corporation, where I was responsible for completing a Defense Advanced Research Projects Agency (DARPA) contract, and for implementing MEM fluidic self-assembly (FSA) technology. I left that position in 1999.

9. In 2002, I co-founded and served as COO of Diablo Optics, Inc., where I developed, produced, and commercialized key optical components for HDTV projectors, such as polarization optics, condenser lenses, projection lenses, and ultra-high performance optical interference filters using thin film stacks in conjunction with LED and thin film transistor arrays and devices. I left Diablo in 2007.

10. I am listed as an inventor on twenty-six patents issued in the United States and foreign countries, including one United States design patent. My inventions concern technologies including LED devices, semiconductor materials, glass materials, non-volatile memory cells, thin film transistors, flat panel backplanes and displays, and wafer based active matrices, and various transistor array substrates.

11. I have authored or co-authored twenty-five articles or conference presentations, including numerous papers and presentations concerning lighting and display technologies. My curriculum vitae (Exhibit A) lists these articles, conference presentations, and patents.

12. I am also a member of the several professional organizations, including the OSA, SPIE, AES, SID, and the IEEE.

13. In summary, I have almost 50 years of experience in the field of high tech product development including flat panel displays, transistor array substrates, touch panels, and OLED and LED devices.

14. In the past twelve years, I have served as an expert witness for patent infringement litigation (or arbitrations) or PTAB proceedings in the following cases:

- *Nichia Corporation v. Seoul Semiconductor*, 3:06-cv-0162 (NDCA), on behalf of Seoul Semiconductor Company, Inc.

- *Hewlett Packard v. Acer Incorporated et al.*, U. S. ITC Investigation No. 337-TA-606, on behalf of Acer Incorporated et al.
- *Samsung v. Sharp*, U. S. ITC Investigation No. 337-TA-631, on behalf of Samsung
- *Sharp v. Samsung*, U. S. ITC Investigation No. 337-TA-634, on behalf of Samsung
- *O2Micro v. Monolithic Power Systems et al.*, U. S. ITC Investigation No. 337-TA-666, on behalf of O2Micro
- IPR No. IPR2014-0168 of U.S. 7,612,843, on behalf of Petitioner Sony, Corp.
- *Ushijima v. Samsung*, 1:12-cv-00318-LY (WDTX), on behalf of Ushijima
- *Delaware Display Group LLC and Innovative Display Technologies LLC v. Sony Corp. et al.*, Case No. 1:13-cv-02111-UNA DDEL, on behalf of Sony Corp.
- *Funai v. Gold Charm Limited*, Case No. IPR2015-01468, on behalf of Petitioner Funai
- *Phoenix, LLC v. Exar et al.*, Case No. 6:15-CV-00436-JRG-KNM., on behalf of Exar et al.
- *MiiC v. Funai*, Case No. 14-804-RGA, on behalf of Funai
- *Delaware Display Group LLC v. Vizio*, Case No. 13-cv-02112-RGA, on behalf of Vizio
- *ARRIS v. Sony*, U.S. ITC Investigation No. 337-TA-1060, on behalf of Sony
- *BlueHouse Global, LTD. v Semiconductor Energy Laboratory Co. LTD.*, IPRs on behalf of BlueHouse Global, LTD.
- *Phoenix, LLC v. Wistron Corp.*, Case No. 2:17-cv-00711-RWS, on behalf of Wistron Corp.
- *Ultravision v Absen et al.*, ITC Investigation No. 337-TA-1114, on behalf of Absen et al.
- *Viavi Solutions Inc. v Materion Corp.*, PGR2019-00017, on behalf of Viavi Solutions, Inc.
- *NEC v Ultravision*, IPR2019-01123 and IPR2019-01117, on behalf of NEC

III. LEVEL OF ORDINARY SKILL IN THE ART

15. In my opinion, a person of ordinary skill in the relevant art for the '338 patent would be a person with a bachelor's degree in physics, electrical engineering, or a related field with approximately 3–5 years of experience in active-matrix and/or LED displays and systems, or a postgraduate degree such as a master's degree in physics, electrical engineering, or a related field with approximately 1–2 years of experience in active-matrix and/or LED displays and systems.

16. In my opinion, a person of ordinary skill in the relevant art for the '311 patent would be a person with a bachelor's degree in physics, electrical engineering, or a related field with approximately 3–5 years of experience in touch sensor or other human-machine interaction systems, or a postgraduate degree such as a master's degree in physics, electrical engineering, or a related field with approximately 1–2 years of experience in touch sensor or other human-machine interaction systems.

IV. BACKGROUND

A. '338 patent

17. The '338 patent concerns display panels with light-emitting elements, such as organic electroluminescent display panels. '338 patent at 1:14–21. A commonly used organic electroluminescent display technology is the organic light emitting diode, or OLED. OLED display panels are currently used in high-end mobile phones, watches, televisions, and other products from a number of manufacturers.

18. Displays used in phones, watches, televisions, etc. contain a two-dimensional array of picture elements, commonly called pixels, that can each be controlled to produce a desired color and brightness of light. Together, these pixels form the desired image on the display. Each pixel is typically made up of a number of sub-pixels, commonly in colors red, green, and blue,

corresponding to the three primary colors visible to most human eyes. By controlling the brightness of each sub-pixel, the brightness and color of an overall pixel can be controlled. An example of this layout of sub-pixels is shown in Figure 1 of the patent:

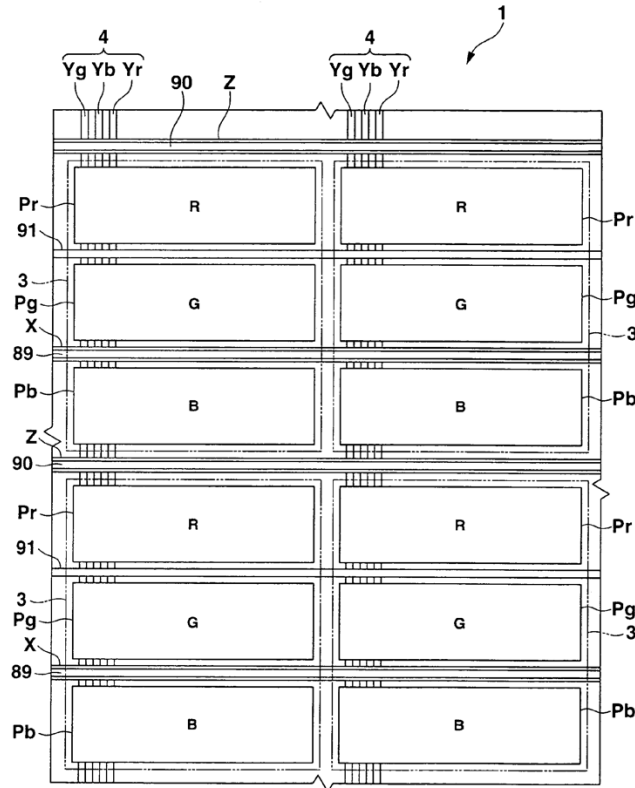


FIG.1

19. Unlike liquid crystal display technology, which uses a backlight, in OLED or other electroluminescent displays, each individual sub-pixel of the display directly emits light. OLEDs are current-controlled, meaning that the light emitted from each sub-pixel depends on the current that flows through the electroluminescent element in that sub-pixel. As the '338 patent explains, the highest quality OLED displays are "active matrix." '338 patent at 1:19–21. This means that each sub-pixel in the display has a circuit associated with it, commonly containing electronic components such as transistors and capacitors, which is responsible for sending the correct amount

20. The '338 patent shows an example sub-pixel circuit in Figure 2:

FIG.2

22. This flow of current causes a corresponding charge to form between the electrodes of the capacitor 24, and when the switch transistor is turned off, a current then flows through diode that depends on the charge on the capacitor, and in this example equals the write current. '338 patent at 15:54–16:13.

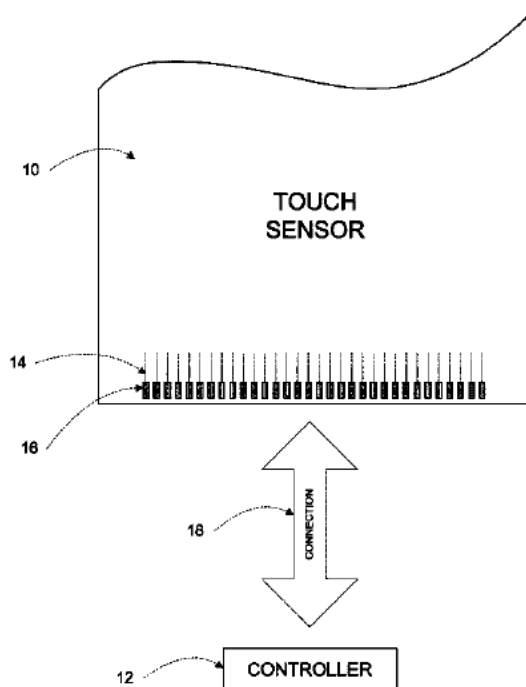
23. The patent specification describes a structure that implements a circuit of this type as a series of thin-film layers in the display panel, and the patent claims aspects of this structure.

B. '311 patent

24. The '311 patent concerns touch sensors for use with display panels, such as those on a mobile phone, tablet, computer or other device. '311 patent at 1:9–23. There are many different ways that a touch sensor can detect the position of a touch, including by measuring resistance, acoustic waves, and capacitance. '311 patent at 1:24–26.

25. Capacitive touch sensors are now the most common sensors used in touch-controlled mobile phones, tablets, and computers. Capacitive sensors detect an object (such as a finger) touching or coming near a surface by measuring the change in capacitance of one or more electrodes that results from the object's influence on electric fields near the electrodes. These electrodes are commonly formed as patterns in one or more layers of conductive materials on a substrate located in front of the display.

26. The '311 patent specification describes touch sensors which are flexible and curve along with the contours of the display of the end device, such as a mobile phone.



It thus teaches (and claims) that the sensors can be wrapped around edges of the display.

V. CLAIM TERMS

A. “transistor array substrate” (’338 patent claim 1)

27. I understand that Solas and Samsung have proposed the following constructions for this term:

Solas:	Samsung:
“layered structure upon which or within which a transistor array is fabricated”	“a layered structure <u>composed of a bottom insulating layer through a topmost layer on whose upper surface electrodes are formed</u> , which contains an array of transistors”

28. Samsung’s proposed construction of “transistor array substrate” includes the terms “array of transistors.” Likewise, Solas’s proposal includes the phrase “transistor array.” Thus, it appears that the parties do not believe that this part of the disputed phrase requires any dispute. I agree—as it is a term of art with a clear plain and ordinary meaning to a POSITA.

29. Moreover, with respect to the term “substrate,” it appears both sides agree it is a “layered structure.” I agree with this as well. To a POSITA, every relevant substrate will be a layered structure. But beyond these points of agreement, Samsung’s construction includes seventeen more words—**“composed of a bottom insulating layer through a topmost layer on whose upper surface electrodes are formed”**—about what that layered structure requires. In doing so, the construction significantly departs from the plain meaning of the disputed term.

30. It is my opinion that Solas’s construction is the only one to accurately capture the plain meaning of “transistor array substrate” as understood by a POSITA, in the context of the ’338 patent. The transistor array substrate is a structure containing a transistor array. The Authoritative Dictionary of IEEE Standards Terms, Seventh Edition (2000) is published by the Institute of Electrical and Electronics Engineers, a premier professional association for electronic and electrical engineering and associated disciplines and a publisher of technical standards. In the context of transistors and integrated circuits, this dictionary provides the relevant definition of substrate: “(1) (integrated circuit) The supporting material upon or within which an integrated circuit is fabricated or to which an integrated circuit is attached.” Solas’s proposed construction of “layered structure upon which or within which a transistor array is fabricated” is consistent with this definition.

31. Samsung’s proposed construction, on the other hand, redefines “transistor array substrate”—and, in particular, the term “substrate”—to require a particular formation of electrodes and to require that formation occur on an “upper surface.” Essentially, Samsung rewrites “transistor array substrate” as “electrode substrate.” This is not how a POSITA would understand the term. A POSITA would understand that a “transistor array substrate” does not necessarily, by definition,

have electrodes formed on it, let alone that the electrodes are necessarily formed on the “upper surface.”

32. Nothing in the specification or the prosecution history defines “transistor array substrate” in a way different from its ordinary meaning or disclaims any form of transistor array substrate.

33. Samsung may argue that “transistor array substrate” is defined by the sentence from the specification: “The layered structure from the insulating substrate **2** to the planarization film **33** is called a transistor array substrate **50**.” ’338 patent at 10:45–47. Samsung may also point to the sentence: “The plurality of sub-pixel electrodes **20a** are arrayed in a matrix on the upper surface of the planarization film **33**, i.e., the upper surface of the transistor array substrate **50**.” ’338 patent at 11:50–52. As understood by a POSITA, neither of these sentences defines the term “transistor array substrate.”

34. Both of these sentences are in the “Detailed Description of the Invention” section which describes a “best mode for carrying out the present invention,” but also says the invention is “not limited” to the embodiment described in the section. ’338 patent at 4:42–50. The quote from lines 10:45–47 of the specification simply says that in the specific example of Figure 6 (see ’338 patent at 8:18–20), the layers from **2** through **33** are called the transistor array substrate. It does not define a transistor array substrate or say that a transistor array substrate necessarily contains specific layers from Figure 6.

35. Even if lines 10:45–47 could be interpreted as defining “transistor array substrate,” they do not define it the way that Samsung proposes. Lines 10:45–47 talk about layer **2**, layer **33**, and the layers in between. Samsung proposes defining “transistor array substrate” based on where a different layer, the electrodes (e.g., sub-pixel electrodes **20a** in Figure 6), is located. Nowhere does the ’338 patent define “transistor array substrate” that way.

36. The sentence from lines 11:50–52 simply points out that in the example of Figure 6, the upper surface of the planarization film happens to also be the upper surface of the transistor array substrate. It does not define the phrase “planarization film” in terms of the phrase “transistor array substrate,” or vice versa. It also does not define either of them in terms of where the “sub-pixel electrodes” are located.

37. This is further demonstrated by another similar sentence in the specification: “An insulating line **61** parallel to the scan line X is formed on the surface of the planarization film **33**, i.e., on the surface of the transistor array substrate **50**.” ’338 patent at 10:48–50. If lines 11:50–52 defined “transistor array substrate” in terms of the sub-pixel electrodes, then lines 10:48–50 would define “transistor array substrate” in a different way, in terms of the insulating line. A POSITA would not understand the patent to be providing two different definitions for “transistor array substrate” in lines 10:48–50 and lines 11:50–52. Instead, a POSITA would understand that these sentences are doing nothing more than describing the relationships between certain layers in an example embodiment of the invention. Each of the sentences at lines 10:45–47, lines 10:48–50 and lines 11:50–52 of the specification is consistent with the plain and ordinary meaning of “transistor array substrate,” which is the construction that Solas has proposed.

38. I have reviewed the extrinsic evidence cited by Samsung, and it is consistent with my opinions. The patents 7,573,068 and 7,498,733 are other patents that share inventors with the ’338 patent and describe inventions with preferred embodiments that are similar to the preferred embodiment of the ’338 patent. In describing these embodiments, they contain similar statements, such as “The layered structure from the insulating substrate **2** to the planarization film **33** is called a transistor array substrate **50**.” 7,573,068 patent at 10:34–35; 7,498,733 patent at 8:47–49. For the same reasons this sentence is not a definition of “transistor array substrate” in the ’338 patent, it is

also not a definition in these other two patents. A sentence describing features of preferred embodiments does not become a definition simply because it appears in more than one patent.

39. Samsung also cites a definition for “substrate” from The New Oxford American Dictionary, Second Edition:

sub·strate /'səb,strāt/ ► *n.* a substance or layer that underlies something, or on which some process occurs, in particular: ■ the surface or material on or from which an organism lives, grows, or obtains its nourishment. ■ the substance on which an enzyme acts. ■ a material that provides the surface on which something is deposited or inscribed, for example the silicon wafer used to manufacture integrated circuits. ► early 19th cent.: anglicized form of **SUBSTRATUM**.

40. In my opinion, this dictionary definition does not reflect the relevant plain and ordinary meaning to a POSITA as accurately as the IEEE dictionary I discuss above. The dictionary is not a technical dictionary, and the definition gives examples from biology that are irrelevant to the technology of the '338 patent. But even this definition does not support Samsung's position: that a “transistor array substrate” is by definition a surface where “electrodes” are formed.

B. “project from a surface of the transistor array substrate” ('338 patent claim 1)

41. I understand that Solas and Samsung have proposed the following constructions for this term:

Solas:	Samsung:
“extend from a surface of the transistor array substrate”	“extend above <u>the upper surface</u> of the transistor array substrate”

42. I have highlighted in bold the text that differs between the two proposed constructions. The bold text in Solas's proposed construction matches language in the claim term. Samsung's

proposed construction, on the other hand, replaces the word “from” with the word “above” and replaces the phrase “a surface” with “the upper surface.”

43. In my opinion, a POSITA would understand the phrase to have the meaning Solas has proposed, in the context of the ’338 patent. The phrase “extend from” has a clear meaning. “Extend above” does not in any way make the construction clearer. The specification never refers to anything extending or projecting “above” something else. Samsung’s proposal simply rewords the claim term, without any support for doing so in the ’338 patent itself.

44. Samsung’s proposal also replaces the phrase “a surface” with “the upper surface.” While the claim allows the interconnections to project from any “surface” of the transistor array substrate, Samsung’s proposal requires that they project specifically from a specific “upper surface.” Samsung appears to be taking a description of one preferred embodiment from the specification and importing that as a requirement of the claims. Specifically, the specification states that “the select interconnection **89** and feed interconnection **90** project upward from the upper surface of the planarization film **33**.” ’338 patent at 11:39-41. But, other descriptions of interconnections leave out the word “upper,” saying for example that “The common interconnection 91 . . . is therefore formed to . . . project upward from the surface of the planarization film 33.” ’338 patent at 10:54-58.

45. A POSITA reading the claims of the ’338 patent in the context of the patent would understand that the claimed “a surface” of the transistor array substrate simply needs to be a surface of that substrate and that there is no need that it be a specific “upper surface,” should the transistor array substrate have more than one surface. Nothing in the specification redefines “surface” to be “upper surface,” and nothing in the specification or the file history that I have reviewed disclaims surfaces other than an “upper surface.”

46. I have reviewed the extrinsic evidence cited by Samsung, and it is consistent with my opinions. Samsung cites a definition for “project” from The New Oxford American Dictionary, Second Edition:

► **v.** /prə'jekt; prō'jekt/ [*trans.*] **1** (usu. **be projected**) estimate or forecast (something) on the basis of present trends: *spending was projected at \$72 million.* ■ [often as *adj.*] (**projected**) plan (a scheme or undertaking): *a projected exhibition of contemporary art.* **2** [*intrans.*] extend outward beyond something else; protrude: *I noticed a slip of paper projecting from the book* | [as *adj.*] (**projecting**) *a projecting bay window.* See note at **BULGE.** **3** [*trans.*] throw or cause to move forward or outward: *seeds are projected from the tree.* ■ cause (light, shadow, or an image) to fall on a surface: *the one light projected shadows on the wall.* ■ cause (a sound, esp. the voice) to be heard at a distance: *being audible depends on your ability to project your voice.* ■ imagine (oneself, a situation, etc.) as having moved to a different place or time: *people may be*

47. The second verb definition in this dictionary uses the word “extend,” which is a word that both Solas and Samsung use in their proposed constructions. But, the definition does not say anything about extending “above” or about an “upper” surface, as Samsung’s construction requires.

C. “the pixel electrodes being arrayed along the interconnections between the interconnections on the surface of the transistor array substrate” (’338 patent claim 1)

48. I understand that Solas and Samsung have proposed the following constructions for this term:

Solas:	Samsung:
“the pixel electrodes are arrayed along the interconnections and located between the interconnections that are on the surface of the transistor array substrate”	“the pixel electrodes are arrayed along the interconnections and located between the interconnections, <u>and the pixel electrodes</u> are on the surface of the transistor array substrate”

49. I have highlighted in bold the text that differs between the two proposed constructions. As I understand the proposals, the difference is that Solas’s proposal states that the interconnections are on the surface of the transistor array substrate, while Samsung’s proposal states that the pixel electrodes are on the surface of the transistor array substrate.

50. In my opinion, Solas’s proposed construction is consistent with how a POSITA would interpret this term. The antecedent for the phrase “the interconnections on the surface of the transistor array substrate” within claim 1 is “a plurality of interconnections which are formed to project from a surface of the transistor array substrate.” As a POSITA would understand the claims, the phrase “on the surface of the transistor array substrate” simply makes explicit that “the interconnections” are the interconnections that “project from a surface of the transistor array substrate,” and not some other interconnections that might be present.

51. I believe that this is made clearer by looking at the claims as they were originally filed at the patent office:

a plurality of interconnections which are formed
to project to a surface of the transistor array
substrate and arrayed in parallel to each other;
10 a plurality of pixel electrodes which are provided
for each pixel and arrayed between the interconnections
on the surface of the transistor array substrate along
the interconnections;

(p. 67 of application filed Sept. 26, 2005)

52. This original claim language differs from the issued claim in that the order of the phrases “along the interconnections” and “between the interconnections on the surface of the transistor array substrate” are reversed. With this original ordering of the phrases, it is even clearer that “on the surface of the transistor array substrate” following the first occurrence of “the interconnections” exists to clarify the antecedent basis of the phrase.

53. The ordering was changed in an amendment that included the following changes:

a plurality of interconnections which are formed to project
~~to from~~ a surface of the transistor array substrate, and which
are arrayed in parallel to each other;

a plurality of pixel electrodes ~~which are provided for the~~
plurality of pixels, respectively, the ~~each~~ pixel electrodes
being and arrayed along the interconnections between the
interconnections on the surface of the transistor array substrate
~~along the interconnections;~~

(p. 2 of amendment filed February 25, 2008)

54. The remarks that accompanied this amendment described a group of changes including these as follows:

The claims have also been amended to make some minor
grammatical improvements and to correct some minor antecedent
basis problems so as to put them in better form for issuance in a
U.S. patent.

(p. 12 of amendment filed February 25, 2008)

55. In other words, these changes were not meant to change the meaning of these phrases, for example by requiring that the pixel electrodes be on the surface of the transistor array substrate.

56. My understanding is consistent with the preferred embodiments described in the '338 patent specification, including Figure 6:

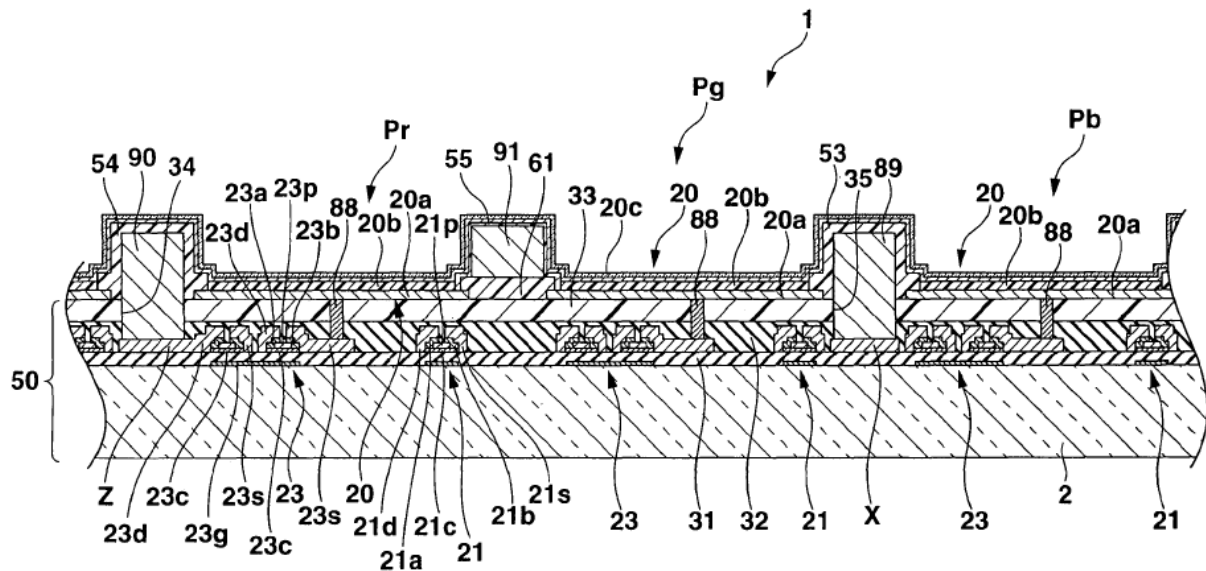


FIG. 6

57. In this figure, the “select interconnections” **89**, “feed interconnections” **90**, and “common interconnections” **91** are all examples of interconnections. A POSITA would understand all three of these interconnections to be “on the surface of” the transistor array substrate **50**. For example, each of these interconnections is described as “projecting upward from the surface of” the planarization film **33**, a part of the transistor array substrate **50**. ’338 patent at 10:54–58 and 11:36–41.

58. Samsung may argue that interconnection **91** is not “on the surface of the transistor array substrate,” because there is a thin “insulating line” **61** between interconnection **91** and planarization film **33**. I don’t believe that the claims require that every single interconnection in the display panel is “on the surface.” But even if the claims did require this, a POSITA would consider interconnection **91** to be “on the surface of” the transistor array substrate, as the terms are used in the ’338 patent.

59. In one place, the '338 patent specification describes a structure being “directly formed on” a substrate. '338 patent at 9:6–7. But the claim term at issue here does not use the word “directly.” Elsewhere, the patent describes something as “on” something else, even though it is not “directly” on that other thing. For example, the specification says in its description of Figure 6 that the “display panel **1** is formed by stacking various kinds of layers on the insulating substrate **2**.” '338 patent at 8:17–23. The layers of the stack are described as “on” the substrate **2**, even though they are not all directly on the substrate.

60. I have reviewed the extrinsic evidence cited by Samsung, and it is consistent with my opinions. As explained above, the patents 7,573,068 and 7,498,733 are other patents that share inventors with the '338 patent and describe inventions with preferred embodiments that are similar to the preferred embodiment of the '338 patent. They contain descriptions of preferred embodiments that are similar to descriptions of the preferred embodiments in the '338 patent, but nothing about those descriptions changes my analysis above.

D. “write current” ('338 patent claim 1)

61. As I explained above in my background section, the write current, in the context of the '338 patent is a current that is supplied from outside of the pixel circuit (for example via a signal line) and is used to “write” information, namely how brightly the pixel should emit light, that is stored in the pixel circuit. Claim 1 of the '338 patent further explains how the “write current” operates, by requiring “a switch transistor which makes a *write current* flow between the drain and the source of the driving transistor.”

62. In my opinion, a POSITA reading the claims, specification, and prosecution history would understand the phrase “write current” in the claims to have its plain meaning: a current that is used to write. I agree that there is no need to construe the term using other words.

63. I understand that Samsung has proposed that this term should be construed as “pull-out current.” I do not believe that “pull-out current” correctly reflects the plain meaning of “write current” to a POSITA. I also do not believe that the ’338 patent has assigned a special meaning to “write current” that is other than its plain meaning.

64. Samsung may argue that “write current” should be construed as “pull-out current” because there are several instances in columns 15–17 of the specification that use the phrase “write current (pull-out current).” However, each of these instances is part of a discussion of a particular example of how the example circuit in Figure 2 can be driven. ’338 patent at 14:40–47, 15:34–37. In other places, the specification uses different words in parentheses following “write current,” for example “write current (current signal)” and “write current (driving current).” ’338 patent at 14:60–61, 17:47.

65. A POSITA reading the specification would understand that the “pull-out current” described in connection with Figure 2 is given as an example of a “write current,” and not as a definition of “write current” or a requirement of what the “write current” must be. Moreover, based on my review of the intrinsic record, there is no statement from the patentee that disclaims all write currents other than those that look like the “pullout” examples.

66. Furthermore, in my experience, “pull-out current” is not a common or well-defined term in the art. It is not defined in the ’338 patent specification. I have reviewed each of the documents that Samsung has identified as extrinsic evidence regarding this term: U.S. Patent Publication Nos. 2004/0113873 and 2004/0165003 and the papers produced as SDC0195815–819, SDC0195820–823, SDC0195824–826, SDC0195827–830, and SDC0195831–834. I note that none of these documents uses the phrase “pull-out” or “pull-out current.” I do not believe that “pull-out current” accurately describes the meaning of “write current” as a POSITA would understand it in the

context of the '338 patent. I also do not believe that it is helpful to a POSITA or anyone else seeking to accurately understand the meaning of the '338 patent claims. Rather, I believe that redefining “write current” as “pull-out current” raises additional questions and possible disputes about what the claim terms mean, rather than resolving any.

E. “configured to wrap around one or more edges of a display” ('311 patent claims 1 and 7)

Solas:	Samsung:
No construction necessary: “configured to wrap around one or more edges of a display”	“wrapped around one or more <u>line segments where two surfaces</u> of a display <u>intersect</u> ”

67. On this dispute, Samsung takes a simple and clear term that the patentee chose—“**edges** of a display”—and replaces it with six other words of its choosing, ““**line segments where two surfaces** of a display **intersect**.”

68. In addition to creating more potential claim-term disputes than it resolves, Samsung’s proposed construction is also inconsistent with the full scope of the plain meaning to a POSITA. Indeed, it limits that plain meaning down to only one specific type of “edge,” namely one that requires “line segments where two surfaces [] intersect.”

69. But Samsung’s proposal does not comport with the plain meaning of “one or more edges of a display.” Samsung’s own extrinsic dictionary definitions prove this. At SDC0068913 (the Concise Oxford English Dictionary), Samsung’s dictionary definition includes “the outside limit of an object, *area or surface*.” It says nothing about that outside limit of the object, area or surface” also requiring “**line** segments where **two surfaces ... intersect**.”

70. In addition to this inconsistency with Samsung’s own extrinsic evidence, Samsung’s injection of these limiting terms creates tension with—and actually appears to exclude—embodiments taught in the intrinsic record, such as the patent specification itself. For example, in

one key teaching, the patent describes how the touch sensor (“touch apparatus 612”) may be *wrapped around a curved surface*” and need not be in any device having surfaces with “*sharper edges (e.g., with radii of less than 1 mm)*”:

FIG. 7 illustrates an example mobile telephone that incorporates a flexible touch-sensitive apparatus. In the example of FIG. 7, example mobile telephone 600 incorporates a touch-sensitive apparatus 612 wrapped around an example display 613. Substrate 602 may include or have attached to it tracking areas, which may include tracks providing drive and sense connections to and from the drive and sense electrodes of touch-sensitive apparatus 612. In particular embodiments, an electrode pattern of touch-sensitive apparatus 612 made from metal-mesh technology with a copper, silver, or other suitable metal mesh, as described above. Substrate 602 may have the electrode pattern disposed on a surface. Substrate 602 and the conductive material of the electrode pattern may be flexible, enabling the conductive material to wrap around the left and right edges of the surface to left-side and right-side surfaces. For sharper edges (e.g., with radii of less than 1 mm), the flexible conductive material of the electrode pattern may be thicker or wider at the sharper edges than at the flat portions of surfaces. In particular embodiments, the electrode pattern may wrap around an edge 603 of example mobile phone 600. In other particular embodiments, touch-sensitive apparatus 612 may be wrapped around a curved surface. The curved surface may be curved in one dimension or in two dimensions. As an example and not by way of limitation, touch-sensitive apparatus 612 may be wrapped over surfaces that are substantially perpendicular to each other or, if there is no substantial distinction between surfaces (such as, for example, a pebble-shaped or curved device), an angle of deviation between the surfaces of 45° or greater. Although this disclosure describes and illustrates a particular use of touch-sensitive apparatus 612 in a particular device, this dis-

'311 patent at 7:37–8:2. In seeking a construction limited to two surfaces intersecting at one or more line segments,” Samsung’s proposal, however, appears to limit the claim term to edges that are sharper than the scope of what the patent describes as optional embodiments with “sharper edges.”

71. Moreover, the portion of the specification expressly describes what Samsung appears to propose (*line* segments where *two surfaces ... intersect*”—as an example of an edge of “*surfaces that are substantially perpendicular to each other*.” But in so doing, it explains that this is only one embodiment—and limiting “edge” to this embodiment only would read out other edges with “*no substantial distinction between surfaces (such as for example, a pebble-shaped or curved device), an angle of deviation between the surfaces of 45 [degrees] or greater*.”

72. The patent makes it clear that the two dimensional surface 603 is an edge in some embodiments. This clearly indicates that in the context of the patent, an edge also can be a two dimensional surface. This is also consistent with the Oxford dictionary definition (the outside limit of an object...). In 7:37-56 it is make clear that these edges may be curved or have various radii. All of these constructions were well-known and accepted by POSITAS at the relevant time period.

73. Notably, under what I understand to be the same claim-construction principles we must apply here, Samsung itself explained and acknowledged to the Patent Trial and Appeal Board recently that the phrase “edges of a display” could cover these two types of embodiments:

1. “edges of a display”

First, the '311 patent does not expressly define what it means to wrap around an “edge of a display.” *It describes* “particular embodiments” in which a touch sensor “may wrap around an edge 603 of example mobile phone 600,” and “*other particular embodiments*” in which the touch sensor is “*wrapped around a curved surface.*” Ex. 1001, 7:55–60 (emphasis added). *It further states that the sensor: may be wrapped* over surfaces that are substantially perpendicular to each other or, *if there is no substantial distinction between surfaces (such as, for example, a pebble-shaped or curved device), and angle of deviation between the surfaces of 45 degrees or greater.*

IPR2019-01668, Paper 1, p. 12 (emphasis added).

74. The problem with Samsung’s construction now is that it effectively excludes the “other particular embodiments” it acknowledged at the PTAB. And that narrow construction does not comport at all with the full scope of the plain meaning of the term.

75. Moreover, I have reviewed the patent and file history and see no evidence of some other definition applied by the patentee—or any disclaimer of claim scope. Even in the optional embodiment—shown in Figure 7—“an edge 603” is not the “edge of a display,” which is the claim term in dispute now. Rather, it is the “edge” 603 of [the entire] mobile phone 600,” which may not tell you about the specific configuration of the “edge of a display” *inside* the mobile phone 600.

76. Even the office action response in which the claim term was added includes no statements by the patentee that suggest any narrowing at all, let alone any narrowing to introduce the “one or more line segments where two surfaces...intersect” language Samsung appears to want to introduce here:

First, Applicant respectfully submits that the proposed *Grant-Hotelling-Gray-Frey* combination fails to disclose, teach, or suggest, expressly or inherently, each feature of amended Claim 1. For example, the proposed *Grant-Hotelling-Gray-Frey* combination fails to disclose at least the following features recited in amended Claim 1 (emphasis added):

a touch sensor disposed on the substantially flexible substrate, the touch sensor comprising drive or sense electrodes made of flexible conductive material configured to bend with the substantially flexible substrate, wherein:

the flexible conductive material of the drive or sense electrodes comprises first and second conductive lines that electrically contact one another at an intersection to form a mesh grid; and

the substantially flexible substrate and the touch sensor are configured to wrap around one or more edges of a display.

The Office Action points to ¶ [0008] of *Hotelling* as allegedly teaching a previous version of Claim 1. Office Action, p. 4. Whether or not those rejections were appropriate (and Applicant makes no admission that they were), the cited portions of *Hotelling* do not disclose, teach, or suggest “the substantially flexible substrate and the touch sensor are configured to wrap around one or more edges of a display,” as recited in amended Claim 1. According to a cited portion of *Hotelling*:

[0008] A multi-touch sensor panel can be created using a substrate with column and row traces formed on either side of the substrate using a novel fabrication process. ***Flex circuits can be used to connect the column and row traces on either side of the sensor panel to its associated sensor panel circuitry.*** Traces made of copper or other highly conductive metals running along the edge of the substrate can be used to bring the row traces to the same edge of the substrate as the column traces so that the flex circuits can be bonded to the same edge of the substrate on directly opposing sides of the substrate, minimizing the area needed for connectivity and reducing the overall size of the sensor panel. A single flex circuit can be fabricated to connect to the rows and columns on directly opposing sides at the same edge of the substrate. Furthermore, the row traces can be widened to shield the column traces from a modulated Vcom layer.


Hotelling at ¶ 8 (emphasis added). That is, while a cited portion of *Hotelling* may disclose flex circuits that connect column and row traces on either side of a sensor panel, it does not

disclose, teach, or suggest “the substantially flexible substrate and the touch sensor are configured to wrap around one or more edges of a display,” as recited in amended Claim 1. The cited portions of *Grant*, *Gray*, and *Frey* do not appear to cure these deficiencies of *Hotelling*. Consequently, the proposed *Grant-Hotelling-Gray-Frey* combination fails to disclose, teach, or suggest each and every element of amended Claim 1.

'311 file history, applicant remarks dated June 19, 2015, pp. 7–8 (emphasis in original).

77. Thus, Samsung's proposal is not and cannot be correct. The term need not be construed, because a POSITA would clearly understand it—and understand it in a way that would conflict with Samsung's proposal.

I declare under penalty of perjury that the foregoing is true and correct. Executed January 28, 2020.

By: 
Richard A. Flasck